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IMPROVING SPONSORED PROJECTS AT WPI

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by

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Abstract

This project sought to improve the availability of sponsored IQPs and MQPs at WPI. In support of WPI's interest in starting an incubator, the feasibility and common traits of successful incubators were analyzed for implementation on campus. Alumni, companies, and incubators were contacted resulting in a strong response from both Alumni and incubators. The project produced a consulting report to the School of Business and an informational packet for incubators. Future work could lead to new course availability.

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Authorship

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Executive Summary	Rayder, Zhao
Introduction	Angeliu
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Executive Summary

WPI has long focused on employing the innovations of graduate students and faculty to provide cutting-edge solutions in the field of engineering science. In recent years the focus has shifted to creating and evolving connections between undergraduates and sponsor companies. As a research institute, WPI has been making strides to better connect undergraduates with established businesses, and is prepared to advance further by launching and improving a diverse array of sponsored projects. Our initial objective was to generate Major Qualifying Projects (MQPs) for WPI undergraduates by building relationships with startup companies and incubators already respected in their industries. These projects utilize in-depth work on specific problems to provide solutions and experience in a student's major field. In response to several roadblocks experienced throughout the project, the direction shifted to improving the connection between the Institute and startup businesses through several paths, including the possible beginning of a physical WPI-affiliated incubator. This project in its final state offers recommendations to Corporate Engagement and the School of Business for improving WPI's project offerings and the Tech Advisors Network (TAN) as they exist today.

Introduction

Projects and real-world experience have always been a core component of the WPI plan. The school motto, "Lehr und Kunst" reflects this approach of immediately applying academic knowledge from classes into real-world applications. All students must complete a Major Qualifying Project (MQP) to graduate, a capstone task worth at least three classes, to prove they are capable of using their studies to solve a problem. Students typically work in groups of three to four, have a faculty advisor, and spend about 300-400 hours per student working on their

MQP. With all these resources dedicated to the project, much can be accomplished. Companies frequently sponsor MQPs as a way to both accomplish a task and foster a relationship with highly competent students. The students benefit from working on a practical application and graduate even more prepared to enter the workforce. WPI wants to see even more companies taking advantage of this opportunity. We therefore set out to grow WPI's Sponsored Projects tradition, particularly among startups through creating a list of recommendations for Corporate Engagement and the School of Business.

Our group's overarching goal was to analyze and improve the Sponsored Projects process, bettering it for both the students and companies. Our initial strategy focused on connecting MQP teams with startups for a variety of reasons. While WPI does charge a project fee, it is much lower than the cost of hiring an engineer or consultant and startups often have little capital. Additionally we believed that the small setting of a startup would guarantee useful work and real-world experience. We therefore began looking for and contacting local startups to inform them of the opportunity to sponsor a project and what is achieved by a MQP. However, we found that startups are typically understaffed and very busy; emailing without having a prior relationship generated almost no interest or leads. This wasn't the case at all though when the startups had a connection to WPI or a personal connection to one of the team members. The use of fraternal contacts generated many more responses than our earlier attempt. This knowledge caused us to rethink our approach to the task and pivot to a new approach: building a connection with incubators and using them to spread awareness about sponsored MQPs.

Aside from overcoming poor results contacting individual startups, there were several advantages to our new incubator approach. A good relationship with a single incubator can provide exposure to 10-100 startups. While startups come and go, incubators tend to be more

stable and around longer. Also, since the startups work in close proximity any successful sponsored projects would certainly be noticed by others and grow the system. With this reasoning we reached out to incubators and analyzed what would be needed to connect with them and lead to project sponsoring. We also talked to WPI's Corporate Engagement office to discuss their vision and how the results of our project could benefit their goals.

What began as a simple mission to improve Sponsored Projects at WPI quickly blossomed into identifying three distinct groups and producing useful material and resources for them. The first group, the incubators, needs information and awareness of sponsored MQPs and a good relationship with WPI. The second group, WPI, needs to build relationships with the incubators, including locating them and supporting their own attempt, the Tech Advisors Network (TAN). The final group is WPI students, who would benefit from more information about sponsored MQPs and can enact the WPI Plan. After analyzing the needs of each group, we created and provided resources to address the problems and foster synergy. For WPI, we produced a consulting report of all of our research, including recommendations from our experience about how to better connect with incubators and the students. We also performed a literature review of successful university-affiliated startup incubators to help WPI grow its own. The MQP process can be confusing or often generate a myriad of questions for companies. For their benefit, we created a short but detailed information packet that can be distributed to the incubators and their companies to raise awareness and save WPI time answering simple questions. Our recommendations to WPI include solutions targeted toward increasing student awareness and responsibility for sponsored MQPs. This includes the design of an elective tailored for each major focused specifically on sponsored projects. All the materials produced can be found in the appendices of this report.

This IQP (Interactive Qualifying Project) is a good example of the type of work WPI students are expected to achieve. Rather than requiring a technical solution, it focuses on social aspect of connecting projects and companies with students and WPI. While completing this project we conducted research through a variety of sources, including startups, incubators, and WPI Corporate. Finally, we put our research and work into action by producing recommendations and materials to achieve our goal of improving the sponsored projects at WPI.

Literature Review / Background

One objective for the project was to research possible directions to better connect MQPs and startup businesses by suggesting changes to the existing WPI business incubator, the Tech Advisors Network. In order to obtain a more complete knowledge of possible methods for creating this progress, we researched the successful practices of existing university-affiliated business incubators. These programs were selected based on their past and current success as well as the ease with which their most important characteristics would fit into the environment of WPI. Many of the programs researched share similar practices, providing a solid base to build a program from and making an Institute-affiliated physical incubator a very real possibility.

The Advanced Technology Development Center at Georgia Institute of Technology

The first example of such an incubator is the Advanced Technology Development Center (ATDC) at the Georgia Institute of Technology. Originally held as an idea created by a group of Georgia Tech alumni known as the “Community of Twenty”, it was formed as a nonprofit organization in 1980 to strengthen the Institute’s ability to promote high technology business and

stimulate technology business growth. This organization was subsequently encouraged by Georgia's then-governor George Busbee's authorization of a study of the state's technology, science, and engineering programs and again when the state legislature moved to award public funding for the ATDC.

Since its creation, the organization has moved its headquarters multiple times; based first in an old high school building, the location was settled six years later on the Georgia Tech campus. After this final relocation, the ATDC expanded to other areas within the state. The program originally included four professional staff members focused on venture capital, education, industrial recruitment, and entrepreneurship development, respectively.

At the present, the Center's services can be categorized into four distinct divisions. These include facilities designed for startups, credibility and the "right" connections, consulting from experienced entrepreneurs, and a supportive environment for participating entrepreneurs. The organization also employs the FAST TRAC Venture Program, a business-training program that enables entrepreneurs to develop an elevator pitch, presentations that will be given to potential investors, and an effective business plan.

However, before one can become a member of the ATDC, he or she must present and receive approval for a completed form and development strategy plan from a review committee made up of staff members. If one successfully passes this first stage, they proceed to a second review stage in which a completed development plan is put before the committee. Judgment is made on product marketability, growth potential, application of new technologies in services, products and processes, and the quality of the entrepreneur's management team. Provided that the applicant's technology is protected by a patent or copyright and the client passes both

reviews, said client can then become a member, a distinction only about one of every five applicants successfully achieves.

Once the applicant has become a member, his or her company will be reviewed by the Center annually and assigned a business management consultant. This consultant works with the assigned company to address any problems that arise. Graduation from the program is expected by the third year and occurs when a company reaches constant profitability, needs more than 5000 square feet of space, hires more than ten employees, is acquired by a larger company, or reaches one million dollars in annual sales. On occasion companies will not achieve any of these goals within this time period. Most biomedical companies face this obstacle, usually graduating in six to seven years because of the long-term nature of their process to develop products.

The aforementioned practices have generated over 9.3 billion dollars in revenue since the inception and resulted in the graduation of 106 companies, 75 percent of which are still in business or have been acquired by other companies. These figures have won the ATDC the Randal M. Whaley Award for Outstanding Business Of The Year (1996) and inclusion in Inc. Magazine's list of the nation's eight most admired nonprofit business incubators (2000). (Pals, 2006; ATDC, 2013).

The Enterprise Center at Salem State University

The second of the examined incubators was the Enterprise Center at Salem State University, which was established in 1996 and owned by the Salem State University Assistance Corporation, a nonprofit organization established by an act of legislature in the same year. The program assists startups of various types, including but not limited to education, advertisement, medicine, fitness, and music. It offers shared facilities to these companies, such as conference

rooms, training rooms, and a kitchen. The Enterprise Center strives for tenants to adjust painlessly to the business world after leaving by promoting independence, encouraging tenants to choose their own banks, marketing firms, and accountants, and renting space above market rate.

To prepare these businesses for departure from the program, the Enterprise Center conducts programs around the community to make people aware of the different creative businesses that exist in the region. These programs follow with the Center's purpose of providing a nurturing and growing environment for businesses that benefit the city of Salem. In line with this, they recently created a sector in the actual facility for very new businesses in which new entrepreneurs will be able to interact more and help each other with the difficulties that may arise along the way.

A key aspect of the Enterprise center is its ability to be self-supporting. Its operations are primarily paid for by leasing facility space, although this is supplemented by scholarships and grants that make many of its programs reality. (*Recommendations for...Worcester*, 2008).

The John Pappajohn Entrepreneurial Center at the University of Northern Iowa

Another university affiliate examined was the John Pappajohn Entrepreneurial Center (JPEC) at the University of Northern Iowa. Operation for the JPEC began in 1996, although the incubation program started in 2004 and representatives began speaking at National Business Incubator Association (NBIA) conferences in 2009. In its early years the program offered courses, advising, and mentoring, but was soon able to expand thanks to funding from private donors and the U.S. Department of Commerce Small Business Administration. With these additional funds, the school launched its physical incubator for students.

In its current state of operations, the program has evolved into an entrepreneurial educator system that accepts student clients on a per-semester basis.To remain in the incubator, one must demonstrate business progress. This progress is expected given the services the incubator offers to both resident clients and non-resident affiliates, who benefit from all of the services except space.

The incubator does not collect fees for its services, instead expecting students to pay for assistance by being available for recruitment efforts and visits by dignitaries, legislators, other government officials, and prospective donors. The JPEC also provides a fellowship program where current students and graduates can donate to the center to assist other student incubator businesses.

A subsection of the JPEC is the R.J. McElroy Student Business Incubator (SBI), which serves as an educational learning laboratory designed to inspire and educate students interested in entrepreneurship and small business. Two types of incubation are provided in this program: physical and affiliate. Physical, or full, incubation provides students with a suite in the Center's facility located in the Business and Community Services building on the UNI campus in addition to base benefits. Affiliate incubation, for students that may not be ready to occupy physical space in the incubator or whose business may not be of the nature that would warrant physical space, offers students all provided benefits aside from space. These include one-on-one technical assistance, legal and accounting services, seed capital programs, market research assistance, state-of-the-art technology, dedicated server space, standard office equipment, access to meeting facilities, a small business resource library, training programs, mentoring programs, and networking opportunities. In 2012, the JPEC provided services to 1298 individuals, 22 of which were physical incubator business owners and 41 of which were affiliate incubator business

owners.

In the SBI, student business owners explore business ideas with the assistance of JPEC staff, and are expected to demonstrate progress to remain in the program. They are required to participate in programs designed to increase their chances for success. (Powell, 2013; *Student Business Incubator*, 2013).

The Jim Moran Institute for Global Entrepreneurship at Florida State University

The first of the Florida-based programs researched was the Student Business Incubator at The Jim Moran Institute for Global Entrepreneurship at Florida State University. This incubator is student centered, low-cost, and generally supportive of new student-driven projects. It helps startup businesses develop launch plans, become established, and evolve to the point where they can operate independently while connecting enterprising students with mentors from faculty and the business community. Additionally, the incubator provides professional office space and facilitates business development to help solve the myriad of problems that every fledgling venture faces.

The goal of the incubator is to create a relaxed learning environment in which classroom education is made relevant for student entrepreneurs who are developing new ideas. As a result, it serves as a focal point for undergraduate business startup activity and provides student entrepreneurs with the necessary resources during startup.

The facility holds office space to support as many as four early stage ventures and a common area for students to take time out to discuss their ideas in a relaxed environment. This space, especially the common area, creates the expectation for residents to work together to

promote the success of each other's operation. Participating students must demonstrate leadership in actively engaging and supporting entrepreneurial activities across the campus in order to keep the space that is provided to them rent-free. This space provides admitted students with controlled access to the facility as well as shared computing and communications resources.

In supplement to this, students can access critical professional resources that they may require, such as faculty and experienced industry professionals from the local entrepreneurial business community that serve as volunteers and advisors. These professionals coach the students in the analysis and execution of their ventures by contributing legal services, financial accounting and bookkeeping, information technology, and other possibly crucial advice that only an experienced entrepreneur can provide. (*Florida State...Incubator,* 2014).

The Rohrer College Business Incubator at Rowan University

A representative program at a smaller university is the Rohrer College Business Incubator (RCBI) at Rowan University. Developed and managed by the Center for Innovation and Entrepreneurship, the RCBI is an engine for economic growth in the Southern New Jersey region. The incubator and Center combined have helped tens of thousands of companies with business, strategic, and go-to-market plans by providing access to broad networks of professionals throughout the region as well as office and reception services, research opportunities, and training and mentoring programs. Outside of these services the RCBI focuses on connecting entrepreneurs to Rowan faculty and students.

The program provides business incubation facilities for emerging regional, high growth technology businesses including dedicated Class A commercial space, access to conference and

meeting rooms, high speed internet and other telecommunications, reception and mail services, and state-of-the-art printing and copying. The incubator's available space can range from one "pod" to multiple offices, and allows access to fully equipped laboratories and managed office amenities.

Those fortunate enough to be a part of the RCBI have access to an influential network of angel and venture capital investors that offer a "big company" lifestyle to small companies and ensure costs are kept low while service levels meet the needs of modern businesses. Each tenant company can employ extensive resources, like support in developing business and technology plans and opportunities to exhibit at conferences and venture capital showcases. These resources also include legal, venture capital, governmental, scientific, licensing, patent, grant funding, marketing, and e-commerce assistance as well. (*About Us*$_1$, 2009).

The Rice Alliance for Technology and Entrepreneurship at Rice University

The most recently decorated university-bonded Incubator is indubitably the Rice Alliance for Technology and Entrepreneurship (RATE) at Rice University. Named Top Global Incubator by UBI Index for 2013, the initiative is devoted to the support of technology commercialization, entrepreneurship education, and the launch of technology-related companies. It was initially formed as a strategic alliance of the George R. Brown School of Engineering, the Wiess School of Natural Sciences, and the Jesse H. Jones Graduate School of Business in collaboration with the Vice Provost and Office of Research.

The RATE is intended to serve as a catalyst through education, guidance, and connections while supporting the creation of technology-based companies and the commercialization of new technologies in the Houston community and the Southwest. Since its

beginnings in 2000, it has assisted in the launch of 250 startups that have raised a total of more than half a billion dollars in early-stage capital. In the same period, more than 1,000 companies have presented at more than 100 programs hosted by the Rice Alliance and more than 26,000 individuals have attended its events. The RATE also publishes a newsletter, which boasts over 24,000 subscribers.

Providing a healthy sense of competition, the Rice University Business Plan Competition has awarded more than 1.3 millions dollars in prizes to startups, and over 130 past competitors are still in business, having raised funds in excess of 394 million dollars. This competitive spirit drives associated businesses to success in the business world outside of the university. (*About Us*$_2$, 2014).

The Sid Martin Biotechnology Incubator at the University Of Florida

The Sid Martin Biotechnology Incubator (SMBI) at the University of Florida (UF) was established on July 2, 1990 by Florida legislature. In 1994, the Board Of Trustees of UF purchased six acres of land in Progress Corporate Park just 20 minutes from campus, and a year later opened a 40,000 square foot bio-business incubator facility there. Making use of funding from various sources including the USDA, UF, and the State of Florida, an 11.5 million dollar complex sporting a 6000 square foot small animal facility, a 20,000 square foot large animal facility, and a 600 square foot climate-controlled greenhouse, was built.

The SMBI was one of the first bio-business incubators in the U.S., developing from Dr. Robert Marston’s idea for a research park in the early 1980s. Land was initially provided on campus by the UF Research Foundation, with the completion of the first building coming in 1987. Since 2007, more than 130,000 square feet of new space has been added. Two thirds of the

more than 30 Park facility businesses are bioscience or technology related, with more than 1,000 people employed on site.

Inside the facility, entrepreneurs can access private, secured labs from 470 to 1,000 square feet complete with fume hoods, bio-safety cabinets, DI water, vacuum, and gas capabilities. All this is available for 28 dollars per square foot. Also provided for participant businesses are a freezer room on generator back-up with separate HVAC, 80-liter and 14-liter fermentation facilities, access to UF's IACUC animal care services at faculty rates, and hazardous waste pickup management.

Entrepreneurs also have access to lab reviews and safety classes through the University's Environmental Health and Safety Unit as well as advanced instrumentation, scientific expertise, and services at reduced rates through UF's campus-based Interdisciplinary Center for Biotechnology Research, Nanoscale Research Facility, and Major Analytical Instrumentation Center. (*Facilities-specifications*, 2013; *University of Florida...Incubator*, 2009).

The Center for Entrepreneurial Growth at the University Of Tennessee

Tennessee's major contribution to university-affiliated incubators is Tech 20/20 at the University of Tennessee, more specifically its Center for Entrepreneurial Growth (CEG). The CEG delivers sponsored programs to assist entrepreneurs in the process of developing an execution strategy that leads to a sustainable company using a proven road map model for entrepreneurial startups that have innovative ideas and want to grow their business, called the Strategic Company Playbook. In addition to this, the CEG has developed an extensive library of entrepreneurial training content with more than 35 seminars.

Such sponsors as The Oak Ridge National Laboratory, The University of Tennessee Research Foundation, the Kentucky Highlands Investment Corporation, and the National Institute for Hometown Security fund the program, which has partnered with the Tennessee Technology Development Corporation to develop the Tennessee New Innovation Competition. This specific program is a statewide opportunity for companies with promising technologies and innovative business models to learn how to prepare for fundraising and provides an opportunity to gain recognition with potential funding partners.

CEG clients have exclusive access to services such as business counseling, management team coaching, and financing preparation as well as review of business plans, financial statements, contracts and pertinent documents, sales, and marketing plans and materials. In addition, the incubator provides coaching in the assessment and development of channel strategies, assistance in defining and working strategic partnerships and alliances, preparation and conduction of educational sessions for CEG company management and staff, development of candidate or position profiles, and assistance in hiring, compensation plan development, and staffing process. If these amenities fail to assist in the development of a company, also available are assistance with the development and review of action plans for company progression from startup to self-sustaining, additional assistance in pursuit of debt or equity financing, access to certified, fee-based business consultants for specific tasks that may be needed during different stages of growth, and periodic access to mentors.

The location itself also sports benefits for CEG clients, including office suites ranging from 260 to 650 square feet, furnished offices, affordable lease terms and rates, conference rooms, and handicap accessibility, with utilities included. The area in which companies are situated also gives clients access to support from 20/20 and other companies as well as capital,

while placing them in proximity to the Tennessee Valley Technology Council. (*CEG Services*, 2013).

John Brumley Texas Venture Labs at the University of Texas at Austin

Another example is John Brumley Texas Venture Labs (TVL) at the University of Texas at Austin (UTA). Housed at the AT&T Executive Education and Conference Center, TVL provides direct links to the entrepreneurial, business, technology, and legal resources available on the UTA campus and the Texas entrepreneurial ecosystem. The program provides the mentoring, team building, market and business plan validation, technology commercialization, and domain knowledge needed to found and fund innovative ventures with the end goal of accelerating startups in taking their ideas to market and transforming grad students into entrepreneurs and business leaders. In the interest of making these ideas a realities, TVL offers opportunities for students ranging from investment and scholarship competitions to partner positions and practicums, while giving businesses access to these expos and competitions. (*About the Jon Brumley Texas Venture Labs*, 2013).

The Arizona State University Venture Catalyst

Arizona contributes to incubation as well, through the Arizona State University Venture Catalyst (ASUVC). This program serves as ASU's entrepreneurial assistance initiative designed to help faculty, students, alumni, and ASU-linked companies launch new startups or accelerate existing ventures. It leverages the expertise of the ASU Office of Knowledge Enterprise Development and Arizona Technology Enterprises to identify and develop higher grade companies. The ASUVC team works one-on-one with faculty entrepreneurs to determine the steps necessary prior to market launch, while the in-house venture team, an extensive mentor

network, and pre-selected service providers are called upon to provide customized business services. Faculty are matched with experienced entrepreneurs and seasoned business executives based on their specific needs and required time commitments; approximately 100 mentors are currently participating in ASUVC programs.

The Catalyst also provides grant support in the form of the Small Business Research (SBIR) and Small Business Technology Transfer (STTR) programs, meant for early-stage technology ventures that are still too high risk to attract funding from private investors. Both of these are coordinated by the U.S. Small Business Administration and provide these grants as part of a three-phase plan. In the first phase, awards of up to 100,000 dollars for about six months are given to support exploration of the technical merit or feasibility of an idea or technology. Subsequently, the grant amount can be increased to around 750,000 dollars for as many as two years, which is to be used for research and development while a developer evaluates commercialization potential. In the final phase, the company or innovation moves into the marketplace, at which point no SBIR funds support it. The small business must find other investors at this point or risk failure. ASUVC supports application to these programs by providing research, assisting with a submission report, and making critical connections to large corporate partners. (*Venture Catalyst at ASU*, 2013)

The Mason Enterprise Center at George Mason University

The final incubator researched was the Mason Enterprise Center (MEC) at George Mason University, which offers expert consultation and training to small business owners and entrepreneurs through a variety of programs and sponsors conferences, workshops, and executive education programs for business leaders throughout the region.

The first of these is the International Business Development Program (IBDP), offering a selection of targeted programs to assist both U.S. and international small and medium information technology enterprises develop international business using a three stage program of consultation, international market planning, and business partnerships. This approach is customized to prepare and promote companies for the achievement of practical business results in key IT marketplaces around the world.

The MEC of Fairfax is another path through which the program supports startups. This facility is a joint venture of the City Of Fairfax and George Mason University that happens to be the largest university-based incubator in the commonwealth of Virginia, boasting over 75 office spaces and over 29,000 square feet of floor space.

MEC also employs the Virginia Small Business Development Center (SBDC) Network. The most extensive business development program in the Commonwealth, his network is an organization of 29 local centers across Virginia that provide professional business counseling, training, and information resources to help grow and strengthen Virginia businesses. It operates as an alliance between the U.S. Small Business Administration, George Mason University, and local sponsors throughout the state including universities, community colleges, chambers of commerce, municipalities, economic development organizations, and private companies.

Along the same lines is the Community Business Partnership (CBP), a nonprofit organization created in 1995 whose array of programs provide a complete resource center for training and support to those seeking to build successful small businesses. This portion of the MEC is targeted toward women, minorities, and low-to-moderate income individuals. Accompanying this program in the assistance of the less fortunate is the Mentor-Protégé

Program (MPP). The MPP supports a Department of Defense (DOD) program and serves as a vehicle and catalyst for building long-term business relationships among major DOD contractors, small disadvantaged businesses (SDBs), and women owned small businesses (WOSBs). It is Congressionally recognized and funded for major contractors to enhance the capabilities of SDBs and WOSBs, serving as a third party developmental assistance provider to protégé firms in general business management, engineering and technical areas, and training.

The last aspect of the MEC tailored to forge connections for business owners is the Procurement Technical Assistance Program (PTAP), a cooperative agreement between the Defense Logistics Agency and George Mason University to provide assistance to and increase contracting and subcontracting activity among small businesses, major prime contractors, and federal, state, and local government. This is accomplished through services such as counseling on business and proposal development, small business programs, program management, market research, outreach, and educational programs. (*Services*, 2014).

Interpretation of Literature Review

The review of available literature on the subject offers examples of a possible course of action in the creation of a university-affiliated incubator at WPI based on the common practices of many current programs. From our research we found nine common factors that tend to lead to success in these ventures. Many of the incubators are located in a separate building near campus, allowing clients to be physically present at the facility without an extensive amount of effort expended. A large number are also managed by the business school, which means more involvement with the university itself. A good portion of the incubators researched require participation in specific educational programs provided by the incubator in order to increase the

entrepreneurial aptitude of those already involved in the program. Every subject of our research provided office space for the participating businesses so that clients could grow ventures in their own space. They employ mentors that are already involved in the business sector so members can learn the “tricks of the trade” before they even enter the business world. Some incubators also assess and monitor the status of each company, and remove those that do not demonstrate progress so that members are motivated to succeed lest they lose their membership. Resources in legal, marketing, and grant departments are provided at a minimal cost to students to allow the focus to be on progress rather than back payments. Finally, they have a consistent planned exit strategy for businesses so that regardless of what service or product a company provides, they exit the incubator at a standard level of development. Given these commonalities and WPI’s integration with the community, a university-associated incubator would certainly be viable. The necessary parts exist in multiple departments and would have to simply be applied in the correct manner, beginning with community business leader involvement in the WPI’s business program. As WPI already runs a “virtual incubator”, the only remaining task is the inception of a physical, tangible space for business incubation. (Tech Advisors Network, 2014).

Methodology

The single greatest challenge in completing our goal of improving the Sponsored Projects at WPI was accumulating and distributing information. None of our team had any experience with startups or a sponsored MQP; most companies have never even heard of an MQP. Therefore we began by familiarizing ourselves with startups and the MQP process. This was accomplished through our preliminary literature review, reviewing sponsored MQP reports, and talking to professors and reviewing WPI’s materials about the process. With a more solid base about what an MQP entailed and what startups would be looking for, we decided the next step was to reach

out to individual startups and to inform them of the opportunity to sponsor an MQP. We used two distinct approaches to selecting startups, with very different results. Through Google and small business searches we compiled a list of startups within an hour of Worcester. We then drafted a brief letter explaining the MQP process and all that it offered with an invitation to open communication with us for more information and how to actually undergo the sponsoring process (Appendix VI). We also used a personal approach to locate interested startups. As each member of our group was affiliated with Greek life, we contacted alumni en masse with the letter through a group email alias. We also distributed the letter to approximately 30 startups we located in our earlier search. The difference in responses was not surprising: the Greek Alumni were enthusiastic in replying and wanting more information while we garnered only one response from the other startups. We received 29 responses from the alumni. four had already had some experience talking to WPI about sponsoring projects and had focused questions about the process for us as they were considering sponsoring an MQP. The other 25 largely had similar, repetitive questions about sponsored projects. This led to three major realizations: that it is easiest to work through a personal connection like alumni, that contacting individual startups had a very low probability of success, and a significant barrier to company project sponsorship was a lack of available information. We also found that startups are typically very busy and low on funds, resources, and time to dedicate to taking a chance on sponsoring a project. This led us to pivot to a new approach: building relationships with incubators who would in turn expose the benefits of sponsored MQPs to many more companies in a more personal and direct setting.

After we shifted to the incubator approach, we met with Sharon Deffley, WPI's Director of the Corporate Engagement Office to discuss the change and collect answers to some of the common questions from the companies that had replied to our initial inquiries. Two of the largest

concerns posed by the companies were the project fee and the handling of intellectual property (IP). Sharon explained the purpose of the fee was to pay for materials and equipment needed for other MQPs and to sustain WPIs project program. This fee varies by the sponsor's ability to pay and typically does not exceed $15,000. To ensure that the students, WPI, and the sponsor are all protected legally in issues of sometimes unclear IP policies, WPI has a position filled by Patricia Lee who reviews all contracts and papers. She pointed out that startups cannot require students to perform tasks that are crucial to the survival of the startup, as students have other classes and responsibilities. It is therefore very important to work out all the expectations and requirements, especially for resources and purchase orders, at the the beginning of the project. Sharon told us that WPI is trying to build sustainable long-term relationships with companies who will provide multiple sponsored projects over the years, such as Gillette and Mitre. This year, WPI is developing a system where students and companies can use the MQP as an opportunity to extend an internship through the sponsored projects. An example of this system would be as follows: a student gets an internship with a company. While at the company, the student builds contacts, makes the company aware of the opportunity to sponsor a project, and can continue their work at the company during the school year through the completion of their MQP. This way the company can get an extended working relationship with the student that could be parlayed into a mutually beneficial job offer. Sharon was supportive of our new approach to contacting incubators and was looking forward to seeing our results and conclusions.

We then moved forward to our new incubator initiative and providing value to interested companies. Back in December, before changing focus, we contacted Barb Finer at the Tech Sandbox incubator to discuss starting a working relationship. Communication with her broke down very quickly though as she was very busy and had many questions about the MQP process

and what benefits sponsored projects offered. As directed by our advisor we then looked for other incubators and companies to contact while realizing she had many of the questions and concerns as our startup responses. We then began to recognize the value that a clear but in-depth informational packet could provide. However, we wanted to reach out to more incubators to get a better feel of the content needed. Using online searches again we compiled a new database of 25 Massachusetts-based incubators made contact over the phone to gauge interest and questions. The responses were largely enthusiastic as nearly all were interested in at least learning more about the opportunity to work with WPI students through sponsored questions.

The final portion of this IQP was producing the necessary recommendations to WPI and Corporate Engagement on how to improve the sponsored projects and creating the informational packet for the startups and incubators. Our recommendations took the form of two consulting reports: one for Sharon Deffley at Corporate Engagement and one for Mark Rice, dean of the Business school at WPI. These consulting reports provided a course of action for WPI to take with expanded reasoning based on our research. Though more fully developed in the results, it includes expanding our work with a future IQP, creating an elective focused on educating students about the sponsored projects and MQP process, and how to better communicate with incubators and startups. As mentioned earlier, many companies we contacted had similar questions about sponsoring a project through WPI. To answer these and improve the overall information available, we produced a concise packet with the necessary details and how to move forward in sponsoring and MQP. The packet includes explanations of the WPI Plan and what an MQP is, summaries of past MQPs to demonstrate what WPI students are capable of, answers to frequently asked questions, and a guide on how to sponsor a project. All the materials produced can be found in the appendices of this report.

Results & Discussion

As stated, the final product of this project varied greatly from the initial intent. The original objective was to contact as many companies as possible and build a new list of available projects. This method proved extremely unsuccessful due to the lack of a prior relationship with companies that could seldom spare the time of their limited staff. As the team encountered issues, the objectives of the project dynamically changed to allow for the most beneficial end result. Accordingly, the objectives were shifted to working with business incubators, which proved to be a much more successful strategy. As the intent of an incubator is to bring resources and opportunities to their clients, the response received was accordingly much more prompt and open to discussion. However, these responses received from incubators frequently posed very repetitive questions, thus an informational packet with basic information regarding MQPs, IQPs, helpful points of contact, and important links was produced. Due to the number of setbacks encountered, developing working relationships with any incubators became unfeasible within the scope of the project and the objective of the project came to its final state. It was decided that contacting incubators with less than a term remaining in the project would be ill advised. If contact had been made, but not finalized prior to the completion of the project, it could damage future opportunities to work with the respective incubators. As such, the final products of the IQP included creating the necessary materials to successfully contact incubators along with a list of those incubators located in the region. Together, these will facilitate a future group focusing solely on initiating contact between WPI and incubators.

In addition to the project objectives adapting due to responses received from companies and incubators, goals were added following meetings with Dean Mark Rice and Sharon Deffely.

Mrs. Deffely explained in our meeting the vision of corporate engagement and its importance to sponsored IQPs as explained in the methodology, setting expectations with the company up front being an important note. This goal was added to the overall project and tied in to the packet of information to be provided to incubators and sponsor companies as well as recommendations in the form of a consulting report specifically for Corporate Engagement.

A similar meeting was held with Dean Mark Rice where he gave an overview of a class that would be offered at the freshman and sophomore level. The intent of this class would be to prepare students with the necessary information to successfully start an MQP with a sponsor company. Additionally available to students, faculty, and alumni is a virtual incubator: the Tech Advisers Network (TAN), where, if a MQP finishes with entrepreneurial potential, a mentor or advisor will assist in the development of the entrepreneurial venture. Following our meetings with Dean Rice, the recommendations for the proposed class as well as investigation into traits of successful incubators were compiled into a consulting report for the Dean.

Through research, the group found that the most successful incubators with ties to a university from around the country have shared a number of common characteristics, many of which WPI is already equipped to provide. These incubators:

1. Are located in separate building near campus.
2. Are managed by the business school.
3. Require participation in specific incubator programs.
4. Provide office space for the participating businesses.
5. Employ mentors that are already involved in the business sector.
6. Assess and monitor the status of each company and remove those that do not demonstrate progress.
7. Have minimal cost to students.

8. Provide access to resources including legal, marketing, grants, etc.
9. Have a planned exit strategy for businesses.

Currently, WPI's Tech Adviser Network provides mentorship and fulfills many of the traits above. However, WPI does not currently have a physical location or provide office space. In meetings with Dean Rice, it was discussed that Alumni Gymnasium is in the process of being repurposed into such an office space. Accordingly, the last common characteristic that WPI currently lacks is a physical incubator location.

Following numerous updates, the final research goal became analyzing and improving the system of sponsored projects at WPI. This goal was subdivided into three categories, improvements for incubators, WPI itself, and WPI students. In order to fulfill the goal of improving project sponsorship through incubators, the group focused on providing as much information as possible via an informational packet. This solution was chosen due to the inevitable stream of questions asked by each incubator contacted. If implemented, future groups and students contacting incubators and companies will likely find it a valuable resource for answering common questions. Next, in order to benefit WPI, the goal of the project had been to identify viable incubators and build a working relationship. As mentioned, setbacks did not allow for working relationships that would yield projects, but over 30 incubators were identified, and many of which when contacted reported being interested in future work with WPI and MQPs. This goal was not fully satisfied, but with the continuation of this project by a subsequent group, those incubators can be utilized to bring in additional sponsor companies. Lastly, the goal of improving the project experience for WPI students was accomplished by improving the availability of information and offering input to Dean Rice for his proposed course curriculum. The option with the greatest potential for helping WPI students is increasing knowledge regarding the availability of resources such as TAN, Corporate Engagement, and, if successfully

implemented, the introductory course. Thus, despite its failure to successfully draw in new projects for the coming years, the project satisfied its end goal of improving project sponsorship at WPI.

Conclusions & Recommendations

The recommendations found in this project are divided into three sections: one general, one for Dean Rice and the School of Business, and one for Sharon Deffely and Corporate Engagement. The general recommendations agreed upon by the group were the following: First, implement a class or series of classes that allows students to learn about MQP opportunities with sponsor companies early in their WPI career, a change that will require flexibility in class requirements. Second, implement a physical location for the virtual incubator (TAN), where students know to go when seeking resources. The success of the incubator is greatly dependent on the interest it can generate, and as demonstrated in the literature review, a number of common features are found in the most successful campus incubators from around the nation, one of the most common being a physical location. Third and final, the accessibility of project sponsorship to interested companies must be vastly improved. This can be done through user-friendly websites and easily interpretable information. By implementing changes to the program, WPI can foster student-business relationships as well as promote the founding of new startup companies by the students themselves.

With Dean Rice's intent of stimulating interest and aptitude in entrepreneurship as well as preparing students with the necessary skills and materials to contact a sponsor company, the following recommendations apply to a freshman or sophomore level class. From the student perspective the class should include the following information:

1. The potential course of internship to sponsored MQP to full time work.
2. How to write a MQP Proposal and find a team; what is required to fulfill a MQP.
3. The basic entrepreneurial skills and necessary information to determine the potential of a project following its academic completion.
4. The process through which a student would take an MQP and continue their work.
5. An understanding of the legal requirements of starting a company. Additionally the requirements for receiving a patent.
6. An understanding of the resources available through WPI and TAN.
7. The necessary information that a student could provide to a company to explain the MQP process and the opportunity to sponsor a project. This could be accomplished through a lecture provided by a guest speaker from Corporate Engagement. This lecture should include where to find resources useful to the students, and that can be provided by students to prospective sponsor companies.

As an additional resource for students, a 'sponsor fair' could be held. However, at the freshman level such an event may not be reasonable as the students still are likely to make changes to their academic Major and coursework. Additionally, the course could include the following assignments to students:

1. Writing an MQP proposal: Writing a proposal would allow students to develop a problem statement that they may still find interesting Junior year at the time of selecting MQPs.
2. Creating a list of companies who would be appropriate to contact for sponsorship: This exercise would allow students to go through the process of locating local companies through appropriate resources.
3. Drafting a letter to send to companies discussing the projects and the respective student's strengths and weaknesses: Having a letter to prospective sponsors be critiqued by a professor would help students work out typical issues such as providing too little or irrelevant information.
4. Writing a Resume and cover letter: Both are important in representing the student to a possible sponsor company.

Next, it is recommended that WPI adds a physical face to the Tech Advisor Network. In its current state, TAN is an excellent resource that is more likely to be investigated further by only alumni and the most motivated students. If there is a physical location to which students can go and receive information and direction, those students who are more apprehensive are more likely to become involved. This location would likely be in Gateway Park with the School of Business and does not require a significant staff. Direction on how to become involved in TAN and the benefits of doing so also must be available to students.

Additionally, the current resources for project sponsorship to both companies and students are lacking. In order to improve upon this it is recommended that the resources available are consolidated into one location. This location should have appropriate keywords added such that is is easily found with generic and specific keywords. Many of these recommendations can also be found in the IQP report titled "Functional Redesign of the WPI Project Website" written this year by Agudelo-Ortiz, Beaulac, Sunde-Brown, Uygur.

Lastly, a possible improvement to corporate engagement would be facilitating contact between student groups and companies. As discussed, when a group of students attempts to contact a company, whether it is a startup or in maturity, the response is very often poor or nonexistent. In order to help address this issue, students could work through Corporate Engagement to initiate contact with companies that the respective group is interested in performing work with. This returns attention to the vision of internship to MQP to employment. It is a superior solution for a student to contact his or her employer with the proposal, and the response would likely be overtly positive.

Future Work

Subsequent work on this project falls into two categories, work to be done by students, and work to be done by faculty. Students interested in the continuation of this project have two major possibilities. In one situation, the project could be continued with the specific goal of working with incubators from start to finish with the intent of building relationships, gathering interest from project sponsors, and further investigating the information that incubators and companies typically require. Alternatively, a student group could work together with faculty to design a course description and plan from the student perspective that would benefit freshmen and sophomores in starting the MQP process. As there is likely a significant difference between students and faculty regarding what information is necessary to the successful initiation and completion of an MQP, an in-depth student analysis could greatly improve the diversity of information.

In addition to the student work, some future work falls to the faculty. In order for a course to attract student interest, it must have benefits that contribute to that student's academic progression. As such, a course that counts as a Major requirement would be more likely to draw students. Additional recommendations for this class are found in conclusions and recommendations. Next, a campus incubator, if implemented, falls outside the capability of students. The management of any such entity must be continuous and as such cannot be completed by students.

Appendices

Appendix I: Consulting Report – Memorandum to Dean Rice, School of Business

1. Overview

a. This memo is organized into two main sections, both of which consist of three sub-sections. In the first section we address our general recommendations, those specific to an incubator run by WPI, and those for working with non-WPI Sponsor companies. In the second section we provide a more in-depth justification for each recommendation.

2. Recommendations

a. General

i. Implement a class, as previously discussed, that helps students plan their MQP path. This class should incorporate information regarding resources available through both WPI Programs and non-WPI Sponsors.

ii. When designing a new course for the introduction of projects, the maximum student interest and participation will be attained by fulfilling Major requirements (i.e. fulfilling a general engineering requirement for Mechanical Engineering). This will require coordination with departments.

iii. In addition to providing students with classes that lead to projects, a functional database of sponsor companies must exist. This database must

also be well publicized to students both taking and not taking the intro classes.

b. Specific to a Successful Campus Incubator

i. Certain characteristics are required of a campus incubator. Above all else it needs to provide the necessary resources to students and businesses. Our research has shown that the most successful on-campus incubators from around the country have shared a number of common characteristics, many of which WPI is already equipped to provide. These incubators:

1. Are located in separate building near campus.
2. Are managed by the business school.
3. Require participation in specific incubator programs.
4. Provide office space for the participating businesses.
5. Employ mentors that are already involved in the business sector.
6. Assess and monitor the status of each company and remove those that do not demonstrate progress.
7. Have minimal cost to students.
8. Provide access to resources including legal, marketing, grants, etc.
9. Have a planned exit strategy for businesses.

c. Specific to Non-WPI Sponsorship

i. With regard to the best individuals and companies to contact, WPI alumni and private business incubators are most successful. Directly contacting businesses without a previous relationship yields very poor results.

ii. When initial contact is made, sufficient information should be provided such that an interested individual or business can easily develop an understanding of the opportunity. Our group is currently finalizing a packet for this purpose.

iii. To facilitate the transmission of information to companies who are interested, the existing “Sponsor a Project” page on wpi.edu should be improved. Currently it is difficult to find with most generic keywords.

3. Expanded Reasoning

a. General

i. A class introducing students to the IQP and MQP process has potential to be extremely useful. However, this class could be easily overlooked or targeted in the wrong direction. It is our belief that the primary focus of this class should be an introduction to the resources available to students with regard to the WPI projects. In addition this class could have students go through the process of creating an MQP proposal that they would later be able, but not required, to use for their actual MQP.

ii. In addition to an available class, the philosophy of internship to MQP to employment has excellent potential, but students must come prepared to interact with the correct individuals in a company to lay the groundwork. Providing the informational packet mentioned previously (2.c.ii) to a company would likely facilitate further dialogue. To encourage this, students must be made aware of and be provided access to this document.

b. Specific to a Successful Campus Incubator

i. The practices of existing university-affiliated incubators serve as an example of proper practices to foster success in a theoretic incubator linked to WPI.

1. The University of Northern Iowa John Pappajohn Enterpreneurial Center keeps those involved through its headquarters in the Business and Community Services building on campus, while the Sid Martin Biotechnology Incubator at the University of Florida utilizes six acres of land in Progress Corporate Park, just twenty minutes from campus.

2. Rowan University's Rohrer College of Business incubator was developed and managed by the university's Center for Innovation and Entrepreneurship. The Rice University Alliance for Technology and Entrepreneurship was formed as an alliance of the schools of Engineering, Natural Sciences, and Graduate Business.

3. Instead of paying monetarily for the space they utilize, businesses at the John Pappajohn Entrepreneurial Center are required to be available for recruitment efforts, visits by dignitaries, legislators, government officials, and prospective donors; the Student Business Incubator at the Jim Moran Institute for Global Entrepreneurship at Florida State University expects its residents to demonstrate leadership in actively engaging and supporting entrepreneurial activities across the campus.

4. The Sid Martin Biotechnology Incubator provides a forty thousand square foot facility for its residents that includes a six thousand square foot small animal facility, a twenty thousand square foot large animal facility, and two greenhouses, while Tech 20/20 at the University of Tennessee provides handicap accessible, optionally furnished office suites ranging from two hundred sixty to six hundred fifty square feet with utilities included. Likewise, the Mason Enterprise center in Fairfax, associated with George Mason University, provides over seventy five office spaces and twenty nine thousand square feet of floor space.

5. Florida State University's incubator also provides students with access to professional resources such as faculty, staff, and experienced industry professionals from the local entrepreneurial business community that coach the students on the analysis and execution of their venture. Arizona State University's Venture Catalyst team works one-on-one with faculty entrepreneurs to determine the steps needed to advance ideas to market launch. Faculty with Venture Catalyst can be matched with experienced entrepreneurs and seasoned business executives based on their specific needs and required time commitments.

6. The Advanced Technology Development Center at Georgia Tech reviews all members annually and evicts those that do not demonstrate a level of success, expecting graduation by the third

year. The John Pappajohn Entrepreneurial Center accepts student clients on a semester basis, only retaining those that show business progress.

7. The JPEC collects no fees for services to allow residents to focus their efforts on productive work. At Florida State University, space is provided for free for up to a year period, renewable annually.
8. The Small Business Innovation Research program and Small Business Technology Transfer program at Jon Brumley Texas Venture Labs at the University of Texas at Austin provide funding for early-stage technology ventures that are still too high-risk to attract funding from private investors. Both programs give awards to prospective ventures that they deem to be feasible. Rice University boasts the world's richest and largest business plan competition, having awarded more than $1.3 million in prizes
9. At Georgia Tech, graduation from the incubator is expected within three years, and can be achieved when the business reaches constant profitability, more than 5000 square feet of space is needed, it employs more than 10 employees, it is acquired by a larger company, or reaches one million dollars or more in annual sales. The Enterprise Center at Salem State University, alternatively, encourages tenants to choose their own banks, marketing firms, and accountants, while renting space above the

market rate to encourage departure from the incubator into the business sector.

c. Specific to Non-WPI Sponsorship

i. Our group attempted to make contact with a list of nearly 30 companies. We received contact back from none of the representatives who were contacted. This demonstrated that in the case of a student contacting a company, there is very little chance of success. However, an employee of WPI would likely have at least marginally better success based on their social status.

ii. In contrast, we found that alumni were extremely responsive to contact. When contacting the alumni base of our respective fraternities, we received nearly 30 responses with two days. We attribute this success to an existing relationship between ourselves and the individuals contacted.

iii. Similarly, working with incubators is much more likely to succeed than working directly with startups. By definition an incubator is intended to provide resources to a company, and in this case that resource would be a WPI project opportunity. The existing relationship between the incubator and each respective company would elicit a greater response.

Appendix II: Second Memo to Dean Rice, School of Business

1. Overview

a. This report covers specific recommendations regarding the implementation of an introductory class. It is intended to serve as an addendum to our previous memo. Here we provide two subsections; suggested topics to cover throughout the class and suggested coursework to best prepare the students. These suggestions are intended to supplement any existing plans and incorporate a point of view from the student perspective.

2. Recommendations

a. Suggested Topics

   i. The potential course of internship to sponsored MQP to full time work.

   ii. A guest speaker from Corporate Engagement to prepare students with internships to open a dialogue with their employers.

   iii. How to write a MQP Proposal and find a team; what is required to fulfill a MQP.

   iv. The basic entrepreneurial skills and necessary information to determine the potential of a project following its academic completion.

   v. The process through which a student would take an MQP and continue their work.

vi. An understanding of the legal requirements of starting a company. Additionally the requirements for receiving a patent.

vii. An understanding of the resources available through WPI and TAN.

viii. The necessary information that a student could provide to a company to explain the MQP process and the opportunity to sponsor a project.

b. Suggested Coursework

i. Writing an MQP proposal: Writing a proposal would allow students to develop a problem statement that they may still find interesting Junior year at the time of selecting MQPs.

ii. Creating a list of companies who would be appropriate to contact for sponsorship: This exercise would allow students to go through the process of locating local companies through appropriate resources.

iii. Drafting a letter to send to companies discussing the projects and the respective student's strengths and weaknesses: Having a letter to prospective sponsors be critiqued by a professor would help students work out typical issues such as providing too little or irrelevant information.

iv. Writing a Resume and cover letter: Both are important in representing the student to a possible sponsor company.

v. One-on-one practical at the end of the term where the student 'sells' the MQP concept to an 'employer'.

Appendix III: Memo to Sharon Deffely, Corporate Engagement

1. Overview

a. This memo is organized into two main sections, recommendations and explanations. Additionally, our project report addresses our findings regarding utilizing incubators to build connections with sponsor companies in detail.

2. Recommendations

a. Our group spent a great deal of time to work directly with companies with little success. We had the best results working incubators. We suggest that Corporate Engagement works with the School of Business to secure an IQP team. This team can be tasked directly with reaching out to incubators and utilizing those connections to contact companies.

b. With regard to the best individuals and companies to contact, WPI alumni and private business incubators are most successful. Directly contacting businesses without a previous relationship yields very poor results.

c. When initial contact is made, sufficient information should be provided such that an interested individual or business can easily develop an understanding of the opportunity. A packet is included as an appendix to our project report.

d. To facilitate the transmission of information to companies who are interested, the existing “Sponsor a Project” page on wpi.edu should be improved. Currently it is difficult to find with most generic keywords.

3. Expanded Reasoning

a. Our group attempted to make contact with a list of nearly 30 companies. We received contact back from none of the representatives who were contacted. This

demonstrated that in the case of a student contacting a company, there is very little chance of success. However, an employee of WPI would likely have at least marginally better success based on their social status. Utilizing the existing relationship between an incubator and its sponsored companies, a future IQP team can work to bring in more sponsor projects.

b. In contrast to startups with no relation to our group or WPI, we found that alumni were extremely responsive to contact. When contacting the alumni base of our respective fraternities, we received nearly 30 responses with two days. We attribute this success to an existing relationship between ourselves and the individuals contacted.

c. Similarly, working with incubators is much more likely to succeed than working directly with startups. By definition an incubator is intended to provide resources to a company, and in this case that resource would be a WPI project opportunity. The existing relationship between the incubator and each respective company would elicit a greater response.

Appendix IV: Informational Packet

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Sponsored Projects: What WPI Students Can Do For Your Company

100 Institute Road

What is the MQP?

The MQP is the final project for a WPI student before graduation. Through this senior year capstone project they gain real-world design or research experience and contribute to the progress of their field. Students typically work in groups of 3 to 4 and have faculty advisors to keep them on the right track. It replaces 3 classes; students typically work on it for three of our 7-week terms. They cover a wide variety of fields and many companies sponsor MQPs to accomplish research and find future employees. Examples of past MQPs can be found on the next page.

MQPs and Companies

Many businesses, from as large as Oracle and Caterpillar to Worcester-based start-ups will take advantage of this system to accomplish research or solve a problem. By sponsoring an MQP they provide a problem for the student team to solve or research. They also may allocate funds for material and other costs necessary for completion of the project. The MQP team will then typically work for 21 weeks part-time to complete the assignment that culminates in a paper and presentation of the findings. During that time they may work at WPI, the sponsor's facilities, or a combination of the two.

Company Benefits

- A team of top students dedicated to solving a relevant business problem
- Opportunity to test future hires
- Builds a relationship with WPI and students

Student Benefits

- Real-world experience working in teams
- Delivering a useful end product
- Opportunity to work with a professional organization

How it Works: Sponsored MQP

A sponsored project brings together the talents of WPI's recognized student body with a sponsor looking for a solution to a problem. A sponsor may propose a project or back a student's proposal. After working with WPI to verify the project, a team of students and faculty advisor are recruited. Typically MQP teams are 3 to 4 students, with each student offering at least 300 to 400 hours of dedicated work. The sponsor will decide which time format they prefer. The project can be completed in one 7-week term, with the MQP being the student's only academic responsibility. The other option is across three 7-week terms, with the students taking 2 concurrent classes (typical class load is 3). As a minimum, a full project report will produced, as well as a presentation.

Examples of MQPs

Development of a Visual Humidity Indicator for 3D Printing for Metal Casting: Developed a way to determine the moisture content of a 3D printed mold used for metal casting. Sponsored by Viridis3D

GE Environmental Improvement: Optimized two waste treatment processes, brush nickel plating and removing heavy metals from wastewater with a cost analysis. Sponsored by GE Aviation http://www.wpi.edu/Pubs/E-project/Available/E-project-121312-141653

NVIDIA Regression Testing Utilities: Created two software tools to reduce regression testing time on Tegra chips used with Android. Sponsored by NVIDIA http://www.wpi.edu/Pubs/E-project/Available/E-project-121312-141653

90 Degree Hybrid Coupler: Redesigned a coupler to sponsor specifications to increase bandwidth and decrease device size. Increased bandwidth by 150% and reduced area by 63%. Sponsored by Skyworks Solutions Inc http://www.wpi.edu/Pubs/E-project/Available/E-project-040913-135531/

The Smart Lightbulb: Created a hybrid lightbulb with halogen and fluorescent components to create a bulb that can operate more efficiently in the cold as well as warm-up three times faster. http://www.wpi.edu/Pubs/E-project/Available/E-project-042909-204618

Sabertooth: A High Mobility Quadrupedal Robot Platform: Built a 300 pound 4'x3'x3' quadrupedal robot capable of traversing rough terrain and stairs. http://www.wpi.edu/Pubs/E-project/Available/E-project-042711-185653/

Automated Refueling for Hovering Robots: Designed a base that can change a standard UAVs battery, maximizing in-air duty cycle. http://www.wpi.edu/Pubs/E-project/Available/E-project-031212-181154/

Assessing the Economic Impact of Incubators on Massachusetts- Mass Biomedical Initiative: Examined the impact of the Massachusetts Biomedical Initiatives on several economies. Conducted surveys, gathered data, and culminated in a full report. http://www.wpi.edu/Pubs/E-project/Available/E-project-042512-145511/unrestricted/Brown_and_Roberto_MQP_Final.pdf

Frequently Asked Questions:

Q: What is the final product of a sponsored project?
A: It depends on the goals of the sponsor. Everything from simulations to working prototypes to final designs has been produced. The requirements will be set at the beginning of the project. A full report and presentation will be also be provided by the MQP team.

Q: What disciplines of projects can be proposed?
A: WPI has students of nearly every science and engineering discipline. Biology, biotechnology, business, chemistry, civil, computer science, electrical, mechanical, mathematic, and robotics engineers are all available.

Q: What fees are associated with this program?
A: Fees are negotiated between the sponsor's needs and project costs. Sponsors are responsible for expenses and a small project fee that goes directly to supporting the Sponsored Projects Center.

Q: How is intellectual property handled?
A: WPI retains an employee dedicated full-time to negotiating intellectual property and protecting all parties involved.

How to Sponsor an MQP:

1. Propose a problem to solve or area of research through a brief narrative-
    a. Restrictions:
        i. Completed full-time in 7 weeks OR
        ii. 10-15 hours/week for 21 weeks
        iii. Typically 3-4 students, but team size can change
        iv. Cannot be crucial to the survival of the business
2. Make contact with WPI
    a. Executive Director of Sponsored Projects: Sharon Deffley
        i. sdeffely@wpi.edu or 508-831-5635
3. Work with WPI to form a student/faculty team to work on the project

For more information:

WPI Website: http://www.wpi.edu/academics/Projects/information.html
Project Sponsorship: http://www.wpi.edu/academics/ugradstudies/sponsor-project.html
MQP Database of past projects: http://www.wpi.edu/Pubs/E-project/browse/mqp_by_department/

Contact: Sharon Deffley, Executive Director of Sponsored Projects

Appendix V: Incubator Contact List

Incubator Name	Business Location	Phone Number	Email Address	Contact Name	Web Link
Institute for Energy and Sustainability	16 Claremont Street, Worcester, MA 01610	508-751-4600	info@energyandsustainability.com	n/a	http://energyandsustainability.com/
Running Start	95 Prescott Street, Worcester	774-312-7569	n/a	n/a	http://www.runningstartinc.com/#
Massachusetts Association of Business Incubators	400 Tradecenter, Suite 5900, Woburn, MA 01801	781-569-5299	info@massincubators.org	Eric Anderson	http://www.massincubators.org/
The Art of Science Learning	230 East 48th Street	917-776-1020	jkressler@artofsciencelearning.org	Joyce Kressler	http://www.artofsciencelearning.org/new-worcester-incubator/
Massachusetts Biomedical Initiative	60 Prescott Street	508-797-4200	n/a	n/a	http://massbiomed.org/business/contact-us
Blue Sky BioServices	50 Prescott Street	800-383-7795	n/a	Paul Wengender	http://www.blueskybioservices.com/
Mass Challenge	One Marina Park Drive, 14th Floor, Boston, MA 02210	1-888-782-7820	n/a	n/a	http://masschallenge.org/
Oregon Nanoscience and Microtechnologies Institute	1110 NE Circle Blvd, Corvallis, OR 97330	541-713-1348		n/a	http://www.onami.us/
Cambridge Innovation Center	1 Broadway 14th Floor, Cambridge, MA 02142	617-758-4200	space-camb@cic.us	n/a	http://cic.us/
Business Growth Center	1 Federal Street, Springfield, MA 01105	413-355-5680	n/a	n/a	http://businessgrowthcenter.org/
Entreprise Center at Salem State University	121 Loring Ave, Salem, MA 01970	978-542-7528	lswanson@enterprisectr.org	n/a	http://enterprisectr.org/
Venture Development Center	100 Morrissey Blvd. Wheatley Hall Floor 3, Boston 02125-3393	617-287-6070	vdc@umb.edu	n/a	http://www.umb.edu/vdc
North Shore InnoVentures	100 Cummings Center, Suite 438N, Beverly, MA 01915	508.527.1832	n/a	Martha Farmer	http://nsiv.org/
Newburyport Clean Tech Center	10 Mulliken Way, Newburyport, MA 01950	(978) 609-3053	info@ newburyportcleantech.com	n/a	http://newburyportcleantech.com/
Massachusetts Medical Device Development Center	University of Massachusetts M2D2 Wannalancit Business Center, 600 Suffok Street,	978-934-3465	M2D2@uml.edu	n/a	http://www.uml.edu/About/default.aspx

	2nd Floor, Lowell MA 01854				
Greentown Labs	28 Dane Street, Somerville, MA 02143	n/a	info@greentownlabs.org	n/a	http://greentownlabs.org/member-companies/
Advanced Technology & Manufacturing Center	151 Martine Street Fall River, MA 02723	508-910-9800	atmc@umassd.edu	n/a	http://www.atmc.umassd.edu/
Arthur M Blank Center for Entrepreneurship	231 Forest Street Babson Park, Massachusetts 02457-0310	781-235-1200	n/a	n/a	http://www.babson.edu/Pages/default.aspx
BioSquare	Albany Street, Boston	617-353-8630	donovanm@bu.edu	Michael J. Donovan	http://www.biosquare.org/bdic/BDIC.html
(CVIP) OTM UMass, Worcester	UMass Medical School Office of Technology Management Higgins Building, 222 Maple Avenue, Shrewsbury, Massachusetts 01545	(508) 856-4390	james.mcnamara@umassmed.edu	James McNamara, Ph.D., Executive Director OTM	http://www.umassmed.edu/otm/index.aspx
CVIP UMass Boston	University of Massachusetts Boston, Office of CVIP, 100 Morrissey Boulevard, Boston, MA 02125-3393	617-287-5710	Susan.Daudelin@umb.edu	Susan Daudelin, Director of Industry Relations	http://www.umb.edu/research/info_for_faculty_staff/post_award_management/commercial_ventures_intellectual_property
Dartmouth Regional Technology Center	Centerra Resource Park, 16 Cavendish Court, Lebanon NH 03766	603-646-0298	sandy.rozyla@dartmouth.edu	Sandy Rozyla, Program Manager of Dartmouth Entrepreneurial Network	http://www.thedrtc.com/
Martin Luther King Jr. Business Center	237 Chandler Street, Worcester, MA 01609	508-756-6330	mlkj-bec@rcn.com	n/a	http://www.mlkj-bec.org/?addr=home
Dartmouth Advanced Technology & Mfg Ctr	151 Martine Street Fall River, MA 02723	508-910-9800	n/a	n/a	http://www.atmc.umassd.edu/

Appendix VI: Letter to Startup Companies

Dear Representative,

We are a team of students from Worcester Polytechnic Institute (WPI) with the goal of finding start-up companies who are interested in sponsoring WPI students to complete their Major Qualifying Projects (MQPs). These projects are typically centered around the students Major field and can prove extremely beneficial to both the students and company. Furthermore, MQPs can either be completed full time over the course of seven weeks or over three seven-week terms.

These projects focus around "The WPI Plan" which conforms to our motto of "Lehr und Kunst" which translates to "Theory and Practice." Students spend three years learning the academics behind their majors and apply them to smaller projects; in their senior year, a student's education culminates with their MQP, where they practice and apply the theories they have learned.

One stipulation of a MQP is that it must center on academic development and should satisfy the objectives of the department responsible for their major. Simply put, the students should be challenged to apply what they have learned rather than performing mundane tasks.

Typically, when a MQP is performed with a company it incurs a fee to the company; however, this fee is subject to change in the case of start-up companies. Based from the financial state of your company, the Corporate Affairs Department of WPI will determine the final cost. If you would like additional information regarding MQPs or examples of past projects, please do not hesitate to contact us.

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